

IBM 2250 Display Unit, Model 1
IBM 2250 Display Unit, Model 2
IBM 2840 Display Control

IBM

Customer Engineering Announcement



The IBM 2250 (Models 1 and 2) and the IBM 2840 constitute a line of display units which can be organized to meet the requirements of numerous scientific and industrial applications. By means of their optional features, the display units may be equipped to perform a great variety of functions ranging from point plotting and alphanumeric display to real-time man-machine communications. Functional and physical modularity enable the customer to select the system capabilities that satisfy his specific needs.

Three units with optional features are available:

- IBM 2250 Display Unit, Model 1 (Display unit for single-unit installation)
- IBM 2250 Display Unit, Model 2 (Display unit for multiple-unit installation)
- IBM 2840 Display Control (Control unit for multiple-unit installation)

Standard Unit Capabilities

The standard, or minimum, performance capabilities of the display units are described below. Other capabilities can be gained by the addition of optional features.

Display Unit, Model 1: This unit can be directly connected to an IBM System/360 via a selector or multiplexor channel. The standard unit provides a direct-view CRT display. The CRT beam is positioned under computer control to any point of a 1024 X 1024 raster. Alphanumeric and graphic information can be generated by point plotting or formed from continuous vertical, horizontal, or 45-degree inclined straight lines. Because of the persistence limitations of the CRT screen, the computer must regenerate the display periodically to maintain display visibility.

Display Unit, Model 2: This unit has the same point-plotting and line-drawing capabilities as the Model 1 Display Unit previously described. It also contains the deflection control circuitry of a character generator (standard in Model 2; special feature in Model 1). The decoding matrix, which completes the character generator, is mounted in the Display Control unit. The Model 2 Display Unit can be located up to 2000 feet from the Display Control unit.

Display Control: This unit can be attached to any IBM System/360 via a selector or multiplexor channel. The standard control unit services up to two Model 2 Display Units. The decoding matrix mentioned previously is time-shared by the attached Model 2 Display Units. An 8192-byte buffer storage, time-shared by the attached Model 2 Display Units, is also contained as a standard device. The buffer storage allocation is under computer program assignment, thus enabling different images to be displayed simultaneously in the attached Model 2 Display Units.

Optional Features

The optional features are described below and are available for factory or field installation on the units noted in the descriptions.

Buffer Storage: The buffer storage feature provides for display regeneration. Computer time is saved because only one data transfer is necessary for each displayed image. One of two buffer storage features, a 4096-byte or an 8192-byte core unit, can be installed in the Model 1 Display Unit. For multiple display unit installations, the 8192-byte buffer storage supplied with the standard Display Control may be increased to 16,384-byte capacity.

Character Generator: This feature reduces the burden on the programmer and saves computer time involved in character formation and regeneration of the overall display. It consists of deflection control and decoding matrix circuitry that forms characters by means of straight-line strokes. One of the two character sizes provided by

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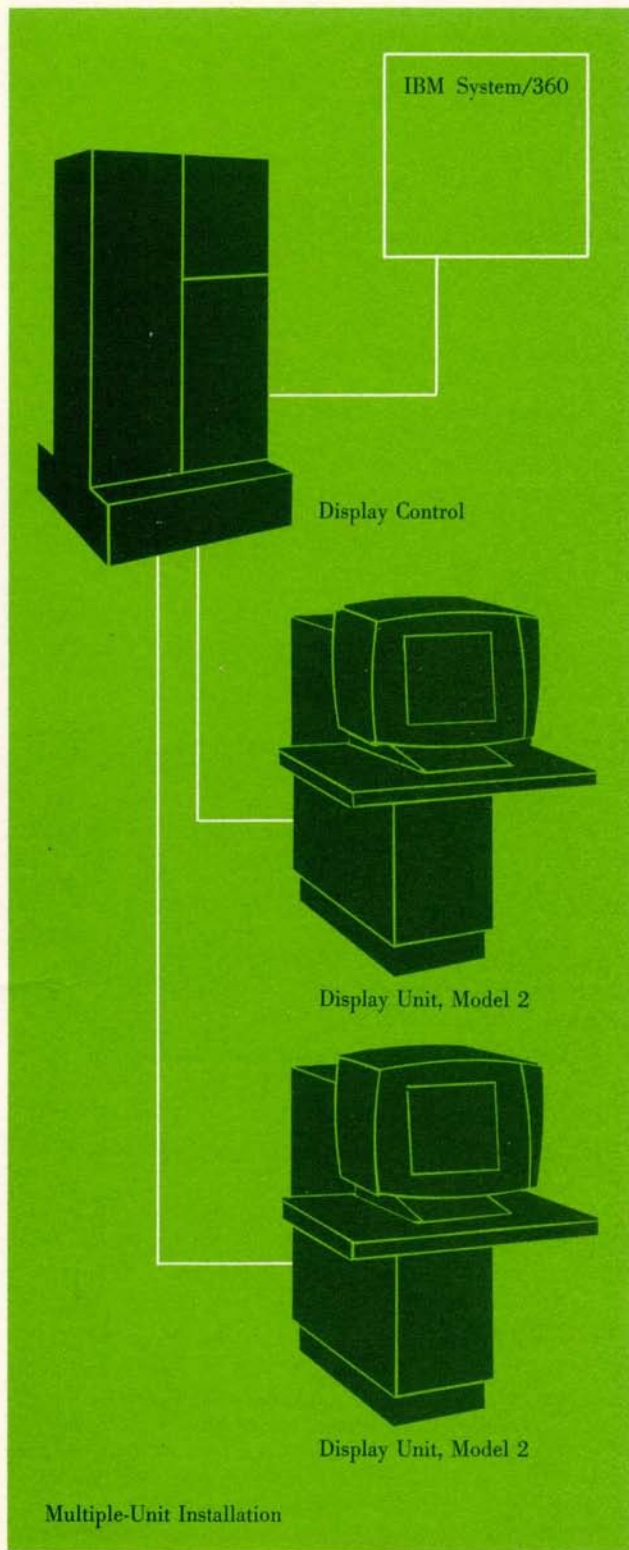
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this feature can be selected by the program. This feature is only optional on the Model 1 Display Unit. It is standard on the Model 2.

A/N Keyboard: This feature enables the operator to compose and edit messages sent to the computer. The feature consists of an alphanumeric keyboard and the circuits necessary to transfer the characters entered on the keyboard to the computer. When the buffer-storage and the character-generator features are also employed, the characters entered on the keyboard are stored in the buffer before they are transferred to the computer. This feature is available for both Model 1 and Model 2 Display Units.

Programmed Function Keyboard: This feature consists of eight overlay code-sensing switches, a 32- (4 X 8) switch program function keyboard, interchangeable overlays, and associated circuits necessary for program interpretation. The overlays fit directly over the keyboard and assign functions to each of the 32 keys. When a selected overlay is set in place, the computer acts on the image as determined by the overlay code and the key assignment. This feature is available for both Model 1 and Model 2 Display Units.

Light Pen: This feature comprises a pen-shaped device (containing a photocell) and the circuits required to identify a luminous point on an alphanumeric or graphic display. When the operator wishes to identify a point, he lines up the tip of the pen with the point on the display. As the beam is deflected through the indicated point, light emitted by the CRT phosphor causes the photocell to generate a response signal. The light-pen response is transmitted to the computer, which relates it to the section of the image generated at the time of the response. When the image point is identified by the computer, the ensuing action is determined by the program. Appropriate programming will enable the operator to add, delete, or rearrange display data. This feature is available for both Model 1 and Model 2 Display Units.

Display Multiplexor: Two additional Model 2 Display Units: This feature provides additional circuits which permit the Display Control unit to increase its service capability by two additional Model 2 Display Units. The Display Control may contain one, two, or three of these 2-unit multiplexor features. Thus, the customer may gradually expand his display unit configuration from two to the maximum of eight Model 2 Display Units which can be attached to one Display Control unit.

Service Aids

The display units are equipped with an operator's panel, a CE panel, and a CRT adjustment panel. When the units are set to maintenance mode, manual controls on the operators and CE panels may be used to simulate operations performed under computer control. Maintenance may also be performed, under computer control, through diagnostic programming.

Typical performance tests that may be made with manual controls are listed below:

1. Generation of computer commands by means of switches connected to the nine lines (P, O, 1, 2, 3, 4, 5, 6, 7) of the input data bus.
2. Single-cycle stepping, which causes the character generator to produce character strokes individually.
3. Test-pattern generation. (The complexity of test patterns depends on buffer storage capacity as provided by the optional feature.)
4. Parity error checking.
5. CRT beam control, which includes focus, intensity, and deflection adjustments.

The summary chart below identifies standard characteristics of the three display units and the optional features which can be added to each unit.

Unit	Standard	Optional Features
IBM 2250 Display Unit, Model 1 (Basic Console and Adapter)	Point-plotting Vertical, horizontal 45-degree continuous lines.	Character generator Buffer storage (4K or 8K unit) Program function keyboard A/N keyboard Light-pen
IBM 2250 Display Unit Model 2 (Basic Console only)	Point-plotting Vertical, horizontal, 45-degree continuous lines. Character generator (deflection control)	A/N keyboard Program function keyboard Light-pen
IBM 2840 Display Control (Control Unit for Model 2 Units)	Display Multiplexor (connects two Model 2 Display Units) Buffer Storage (8K unit) Character generator (Decode matrix for Model 2 Display Unit.)	Buffer storage (additional 8K unit to provide expansion to 16K capacity) Display Multiplexor, (connects two additional Model 2 Display Units) A maximum of three of this feature is allowed

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